

**WHAT IS CLAIMED IS:**

1. A temperature adjustment apparatus for adjusting temperature of an optical member, the  
5 temperature adjustment apparatus comprising:

a first radiation mechanism which includes a first radiation member to transfer radiation heat between a predetermined area of the optical member and for adjusting the temperature of the optical member  
10 with the first radiation member; and

a shielding member for reducing radiation heat that transfers to areas other than the determined area among the radiation heat from the first radiation member.

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2. A temperature adjustment apparatus according to claim 1, wherein the emissivity of the shielding member is less than 0.1 or more than 0.9.

20 3. A temperature adjustment apparatus according to claim 1, wherein the shielding member functions as a stop to limit incidence light to the optical member.

4. A temperature adjustment apparatus according to claim 1, wherein the shielding member is cylinder  
25 shape, and

a side of a space between the optical member and the first radiation member is covered.

5. A temperature adjustment apparatus according  
5 to claim 1, further comprising a temperature adjustment mechanism for adjusting a temperature of the shielding member.

6. A temperature adjustment apparatus according  
10 to claim 1, wherein the optical member and the shielding member are supported by mutually different support members.

7. A temperature adjustment apparatus according  
15 to claim 1, wherein the optical member is a reflection member, and

the first radiation mechanism is opposite to a reflection plane of the optical member.

20 8. A temperature adjustment apparatus according to claim 1, wherein

a radiation plane of the first radiation plate opposite to the predetermined area has a concave shape,

25 and a radius curvature of the radiation plane is the same as distance of center of the radiation plane and center of the predetermined area or longer

than the distance of center of the radiation plane and center of the predetermined area.

9. A temperature adjustment apparatus according  
5 to claim 7, further comprising a second radiation mechanism with a second radiation member that is opposite to another side of the reflection plane of the reflection member, for adjusting the temperature of the optical member by the second radiation member.

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10. A temperature adjustment apparatus according to claim 1, wherein the shielding member is designed to cover at least a periphery part of the optical member.

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11. A temperature adjustment apparatus according to claim 1, further comprising:

a temperature detector for detecting a temperature of the optical member; and

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a controller for controlling the first radiation mechanism based on the detection result from the temperature detector.

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12. A temperature adjustment apparatus according to claim 1, further comprising a channel for a cooling medium to flow through for adjusting temperature of the first radiation member.

13. A temperature adjustment apparatus according to claim 1, further comprising:

a Peltier element located on the other side of the optical member of the first radiation member,

5 a radiator block located on the other side of the Peltier element and the first radiation member; and

a controller for adjusting the temperature of the first radiation member by adjusting current through the Peltier element.

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14. A temperature adjustment apparatus according to claim 13, further comprising a channel located in the radiator block, for a cooling medium to flow through to keep the temperature of the radiator block

15 substantially constant.

15. A temperature adjustment apparatus according to claim 1, wherein the shielding member prevents radiation heat transfers to an area other than the

20 determined area among the radiation heat from the first radiation member.

16. An exposure apparatus comprising:

an optical system, with an optical member,

25 for leading light from a light source to an object,

a first radiation mechanism with a first radiation member to transfer the radiation heat between

a predetermined area of the optical member and for adjusting the temperature of the optical member by the first radiation member; and

5 a shielding member for reducing radiation heat transfers to an area other than the determined area among the radiation heat from the first radiation member.

17. An exposure apparatus according to claim 16,  
10 wherein the light from the light source is EUV light,  
an optical element arranged on an optical path from the light source to the object is all reflection-type optical element, and  
atmosphere of a space where the optical  
15 member is stored is a vacuum or filled with helium gas.

18. An exposure apparatus according to claim 16,  
wherein the shielding member prevents radiation heat transfers to an area other than the determined area  
20 among the radiation heat from the first radiation member.

19. A device fabrication method comprising the steps of:  
25 exposing an object using an exposure apparatus; and

performing a development process for the  
object exposed,

wherein the exposure apparatus includes:

an optical system, with an optical member,  
5 for leading light from a light source to an object,  
a first radiation mechanism with a first  
radiation member to transfer radiation heat between a  
predetermined area of the optical member and for  
adjusting the temperature of the optical member by the  
10 first radiation member; and

a shielding member for reducing radiation  
heat transfers to an area other than the determined  
area among the radiation heat from the first radiation  
member.

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20. A stop apparatus comprising:

a stop, arranged at an incidence side of an  
optical member for limiting incidence light to the  
optical member,

20 wherein the emissivity of the stop is less  
than 0.1 or more than 0.9.

21. An exposure apparatus comprising:

an optical system, with an optical member,  
25 for leading light from a light source to an object,

a stop, arranged at an incidence side of the optical member for limiting incidence light to the optical member,

wherein the emissivity of the stop is less  
5 than 0.1 or more than 0.9.

22. A device fabrication method comprising the steps of:

exposing an object using an exposure  
10 apparatus; and

performing a development process to the object exposed,

wherein the exposure apparatus includes:

an optical system, with an optical member,  
15 for leading light from a light source to an object,  
a stop, arranged at an incidence side of the optical member for limiting incidence light to the optical member,

wherein the emissivity of the stop is less  
20 than 0.1 or more than 0.9.

23. An exposure apparatus comprising:

an optical system, with an optical member,  
for leading light from a light source to an object,

25 a first radiation mechanism with a first radiation member to transfer the radiation heat between a predetermined area of the optical member and for

adjusting temperature of the optical member by the  
first radiation member,

a shielding member for reducing radiation  
heat transferred to an area other than the determined  
5 area among the radiation heat from the first radiation  
member,

a temperature detector mechanism for  
detecting the temperature of the optical member; and

a controller mechanism for controlling the  
10 first radiation mechanism based on the detection result  
from the temperature detector mechanism.

24. An exposure apparatus according to claim 23,  
wherein the controller mechanism adjusts the  
15 temperature of the optical member based on the  
detection result and an exposure schedule that exposes  
object.

25. An exposure apparatus according to claim 23,  
20 further comprising;

a Peltier element located on the other side  
of the optical member of the first radiation member,

a radiator block located on the other side of  
the Peltier element and the first radiation member,

25 a channel located in the radiator block for a  
cooling medium to flow through and keep the temperature  
of the radiator block substantially constant, and



a controller for adjusting the temperature of the first radiation member by adjusting current flow through the Peltier element.

5           26. A device fabrication method comprising the steps of:

          exposing an object using an exposure apparatus; and

          performing a development process to the  
10 object exposed,

          wherein the exposure apparatus includes:

          an optical system, with an optical member, for leading light from a light source to an object,

          a first radiation mechanism with a first  
15 radiation member that transfers the radiation heat between a predetermined area of the optical member and for adjusting temperature of the optical member by the first radiation member,

          a shielding member for reducing radiation  
20 heat transferred to an area other than the determined area among the radiation heat from the first radiation member,

          a temperature detector mechanism for detecting the temperature of the optical member; and

25           a controller mechanism for controlling the first radiation mechanism based on the detection result from the temperature detector mechanism.